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Beyersmith

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[54] **ANTENNA MOUNTING PLATFORM FOR A MONOPOLE TOWER**

[75] Inventor: **Stacy C. Beyersmith**, Tucker, Ga.

[73] Assignee: **Bellsouth Corporation**, Atlanta, Ga.

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[51] **Int. Cl.**[6] **H01Q 1/12**

[52] **U.S. Cl.** **248/219.3**; 108/144; 248/230.1; 343/890

[58] **Field of Search** 248/121, 125, 248/219.3, 225.31, 230, 245; 108/144; 343/879, 890, 891

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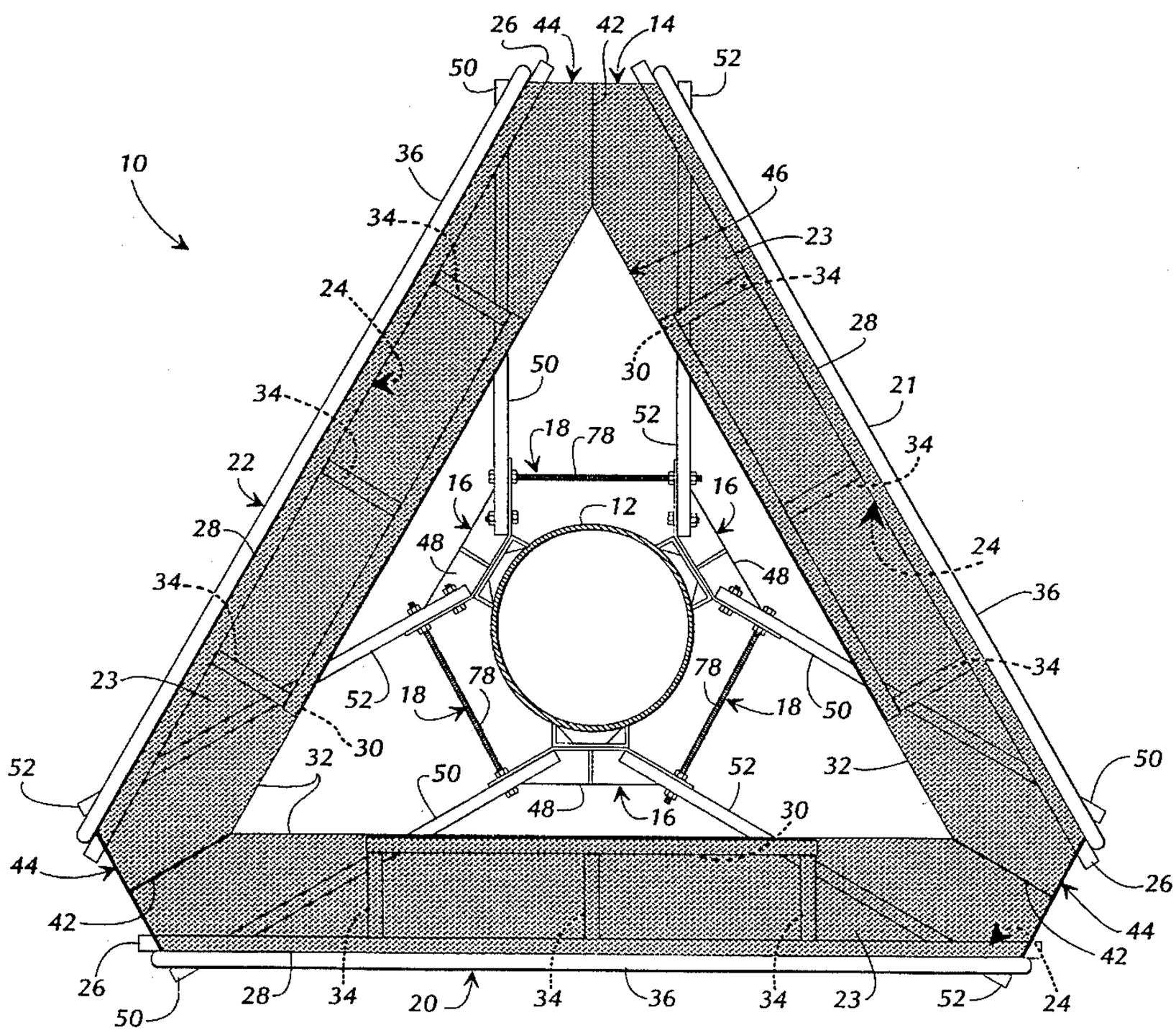
Primary Examiner—Ramon O. Ramirez
Assistant Examiner—Derek J. Berger
Attorney, Agent, or Firm—Jones & Askew

[57] **ABSTRACT**

An antenna mounting platform for mounting at selectable positions along the length of a monopole tower comprises a frame having an interior opening for receiving the monopole, a bracket mounted to the frame and extending to the interior opening and means for selectively (1) forcing the bracket against the monopole and holding the mounting platform on a location on the monopole, and alternatively, (2) releasing the bracket from against the monopole so that the mounting platform is movable along the length of the monopole. Desirably, the antenna mounting platform comprises a plurality of connecting members corresponding to the number of brackets for connecting the brackets. Each connecting member connects adjacent brackets and is operable to selectively compress associated first and second outriggers together and thereby force the brackets against the monopole, and alternatively, decompress the associated first and second outriggers and thereby release the brackets from against the monopole.

12 Claims, 3 Drawing Sheets



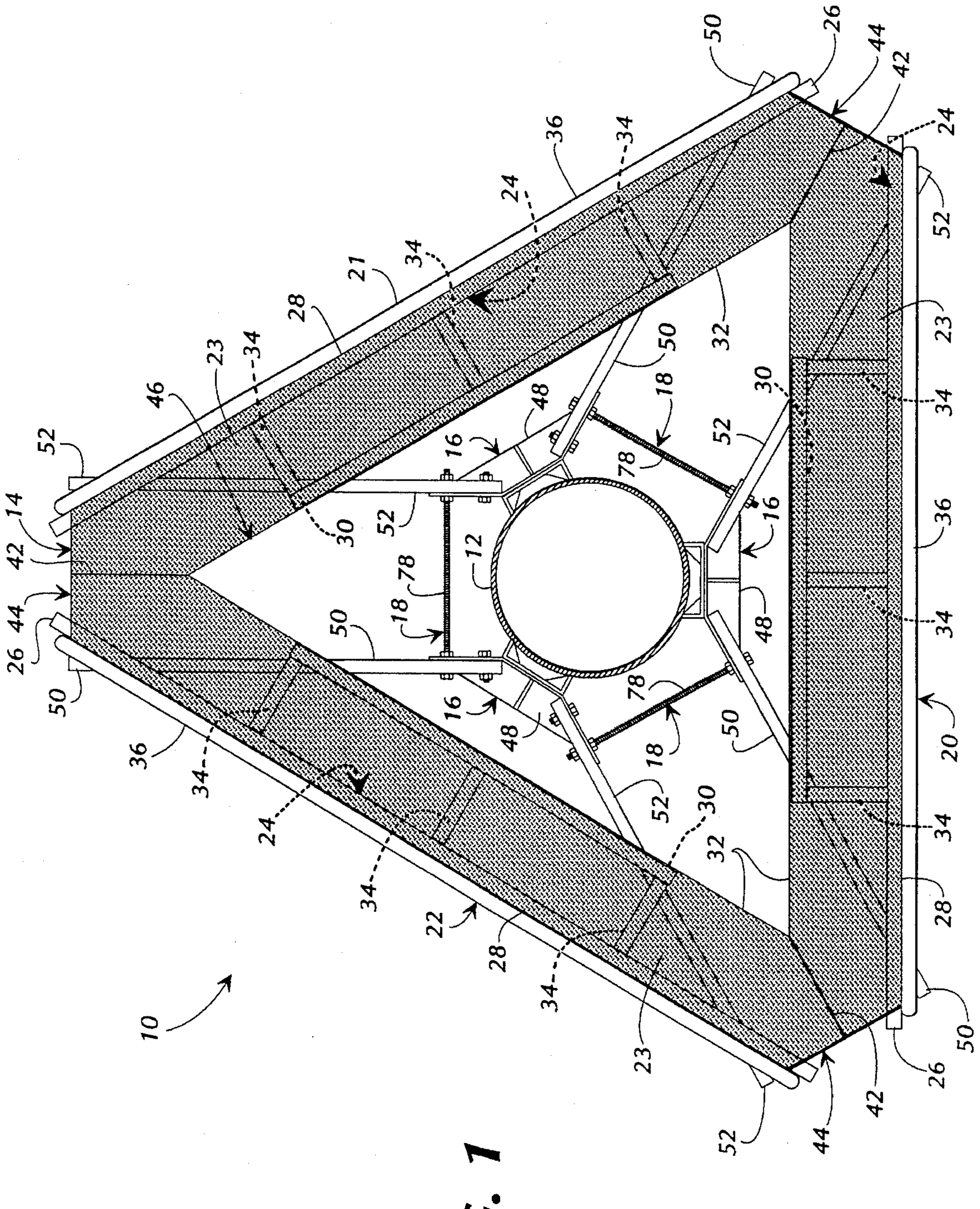


FIG.

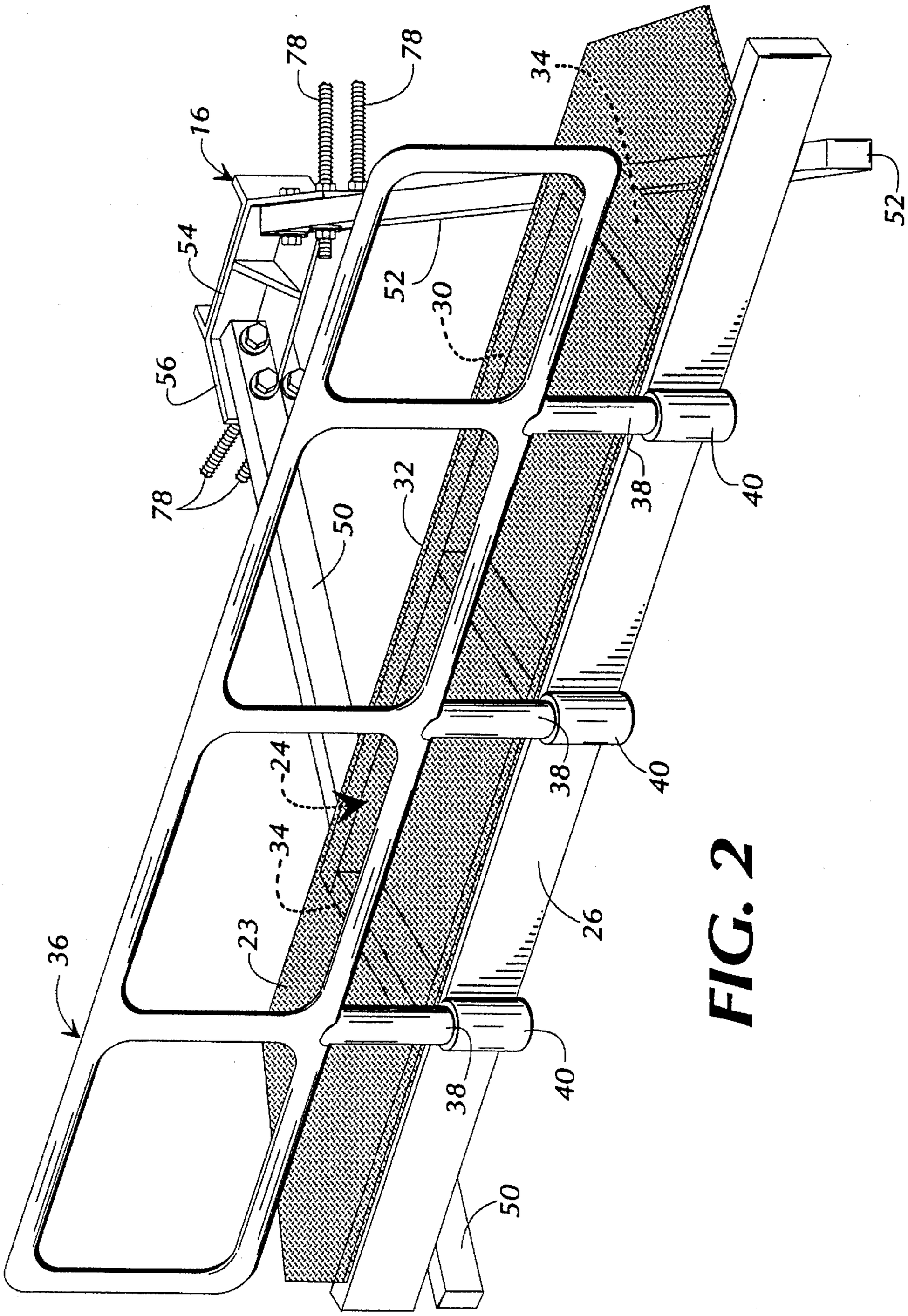


FIG. 2

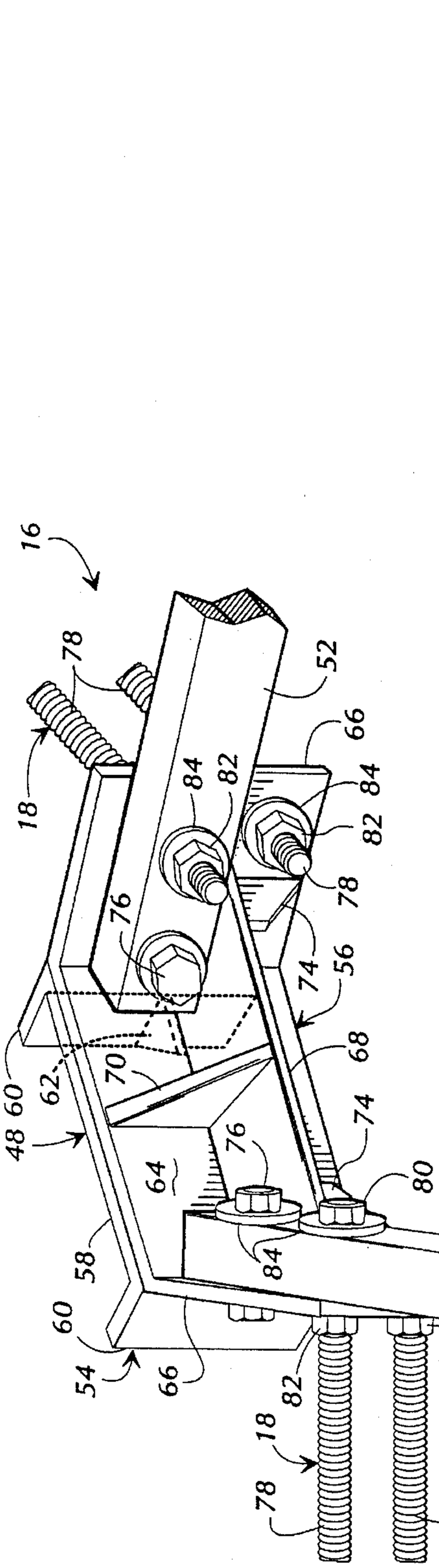

16
78
18
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FIG. 3

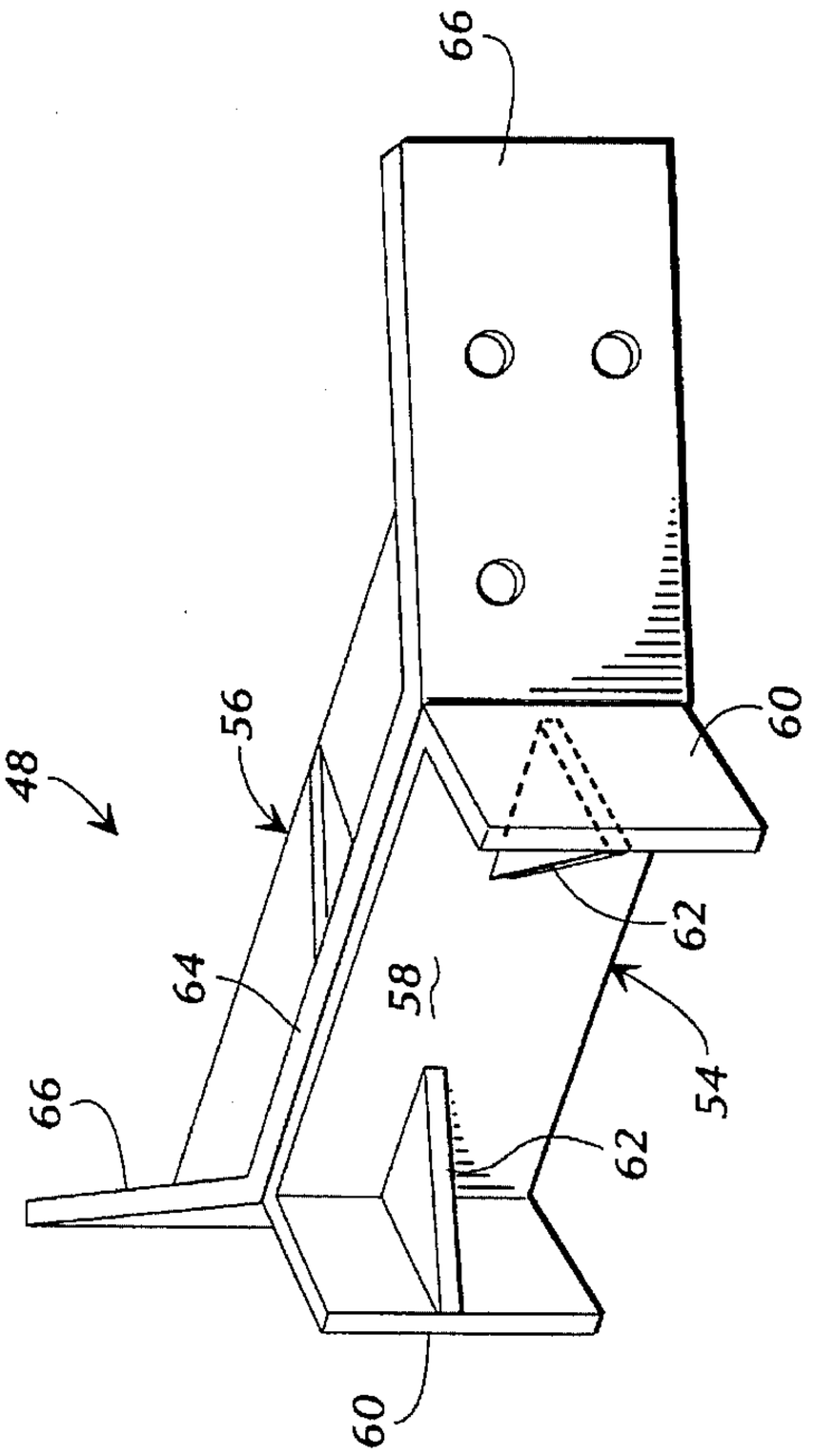
66
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FIG. 4

ANTENNA MOUNTING PLATFORM FOR A MONOPOLE TOWER

TECHNICAL FIELD

This invention relates to antenna mounting platforms, and more particularly, relates to platforms for mounting antennas to monopole towers.

BACKGROUND OF THE INVENTION

Antennas for use in broad-ranging communication systems, such as cellular communications systems, are mounted on towers. Two types of towers for mounting antennas include lattice-type towers and monopole towers. Lattice-type towers comprise a plurality of poles arranged into lattice sections which are stacked one on top of the other to obtain the desired height. Monopole towers comprise a tubular mast.

Typically, a plurality of antennas, some transmitting antennas and some receiving antennas, are mounted on a single tower. It is desirable to be able to change the height and orientation of the antennas from time to time. This is easily accomplished on a lattice-type tower, because the antennas are mounted on removable brackets which can be relocated anywhere on the tower. Monopole towers are more limited in this regard. Antennas are typically mounted to a nonremovable platform at the top of a monopole tower. To lower the antennas on a monopole, one must replace the entire pole with a shorter one.

Accordingly, there is a need for an antenna mounting platform for a monopole tower which can be mounted at selectable positions along the length of the monopole.

SUMMARY OF THE INVENTION

This invention solves the above-described problems in the prior art by providing an antenna mounting platform comprising one or more brackets which can be selectively forced against a monopole to hold the platform at a location on the monopole, and alternatively, released from against the monopole so that the mounting platform is moveable along the length of the monopole. The antenna mounting platform of the present invention can thus be mounted at selectable positions along the length of the monopole tower.

More particularly, the antenna mounting platform of the present invention comprises a frame having an interior opening for receiving the monopole, a bracket mounted to the frame and extending into the interior opening, and a device for selectively (1) forcing the bracket against the monopole and holding the mounting platform at a location on the monopole, and alternatively (2) releasing the bracket from against the monopole so that the mounting platform is movable along the length of the monopole.

Desirably, the antenna mounting platform of the present invention comprises a plurality of brackets mounted to the frame. The plurality of brackets extend into the interior opening of the frame and are spaced about the interior of the opening so that when the antenna mounting platform is mounted to the monopole, the brackets are spaced about the circumference of the monopole. The brackets are desirably spaced about the interior opening so that when the antenna mounting platform is mounted to the monopole, the brackets are spaced substantially equidistant about the circumference of the monopole.

Still more particularly, the antenna mounting platform of the present invention comprises brackets which each comprise a base, a pair of arms spaced from one another and extending from the base toward the monopole when the interior opening receives the monopole, and first and second outriggers for mounting the base to the frame. The first and second outriggers are spaced from one another and extend between and are mounted to the base and the frame. The first outrigger of each bracket is positioned adjacent the second outrigger of an adjacent bracket. Desirably, the antenna mounting platform comprises a number of connecting members corresponding to the number of brackets for connecting the brackets. Each connecting member connects adjacent brackets. The connecting members are operable to selectively (1) compress the associated first and second outriggers together and thereby force the arms of the brackets against the monopole and hold the mounting platform at a location on the monopole, and alternatively, (2) decompress the associated first and second outriggers and thereby release the brackets from against the monopole so that the mounting platform is movable along the length of the monopole.

Each such connecting member desirably comprises a threaded rod extending between adjacent brackets, a head at one end of the rod for holding one of the adjacent brackets, and a nut threaded onto an opposite end of the rod for holding the other of the adjacent brackets. The nut is movable along the length of the rod to selectively compress the associated first and second outriggers together, and alternatively, decompress the associated first and second outriggers.

In a particularly desirable embodiment, the brackets are three in number and the frame is substantially triangular in shape. In addition, the triangular frame has corner regions and the first and second outriggers of each bracket are mounted to and extend from adjacent corner regions. Still more particularly, the frame comprises three sections of substantially equal length (an equilateral triangle) and each of the brackets are positioned adjacent one of the sections and substantially midway between adjacent corner regions. Desirably, the frame comprises a deck and a rail mounted to the deck about the periphery of the deck.

Therefore, it is an object of the present invention to provide an improved antenna mounting platform for use with monopole towers.

Another object of the present invention is to provide a platform for mounting antennas at selectable positions along the length of a monopole tower.

Still another object of the present invention is to provide a simple and economical antenna mounting platform for a monopole tower.

Other objects, features and advantages of the present invention will become apparent from the following detail description, drawings and claims.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is plan view of an antenna mounting platform made according to an embodiment of the present invention.

FIG. **2** is a partial perspective view of a frame section of the antenna mounting platform shown in FIG. **1**.

FIG. **3** is a frontal partial perspective view of one of the brackets that forms part of the antenna mounting platform shown in FIG. **1**.

FIG. **4** is a rearward partial perspective view of one of the brackets that forms part of the antenna mounting platform, shown in FIG. **1**.

DETAILED DESCRIPTION

As summarized above, the present invention encompasses an antenna mounting platform for mounting at selectable

positions along the length of a monopole tower. An antenna mounting platform **10** made according to an embodiment of the present invention is shown in FIG. **1** as being attached to a monopole **12**. Generally described, the antenna mounting platform **10** comprises a frame **14** surrounding the monopole **12**, three brackets **16** attached to the frame and spaced equidistant about the monopole, and three corresponding connectors **18** for connecting the three brackets together. The connectors **18** are operable to selectively (1) force the brackets **16** against the monopole **12** and hold the mounting platform **10** at a location on the monopole, and alternatively, (2) release the brackets from against the monopole so that the mounting platform is movable along the length of the monopole.

The frame **14** comprises three identical sections **20**, **21**, and **22**. Each of the sections **20**, **21**, and **22** comprise a deck **23** fastened to a support **24**. The deck **23** provides a surface on which antennas can be mounted and is shown in FIGS. **1** and **2** as a flat, elongate sheet of metal grading. The deck **23** can be fastened to the support **24** by conventional means such as welding or bolting. The support **24** comprises a peripheral support bar **26** extending along the peripheral edge **28** of the deck **23** and an interior support bar **30** extending along the interior edge **32** of the deck. The peripheral support bar **26** and the interior support bar **30** are connected by three bars **34** extending perpendicularly between the peripheral support bar and the interior support bar beneath the deck **23**. Each of the sections **20**, **21**, and **22** further comprises a rail **36** mounted to the peripheral support bar **26** and extending above the deck **23**. The legs **38** of the rail **36** fit into sleeves **40** mounted to the peripheral support bar **26**.

The sections **20**, **21**, and **22** of the frame **14** are fastened to one another such as by welding along seams **42** to form a triangular frame having corner regions **44** and defining a triangular interior opening **46**. The frame **14** is desirably in the shape of an equilateral triangle so that the weight of the antenna mounting platform **10** is distributed evenly across the antenna mounting platform and the antenna mounting platform is balanced when mounted to the monopole **12**.

The brackets **16** each comprise a base **48** and first and second outriggers **50** and **52** spaced from one another and extending between and mounted to the base and the frame **14**. The first and second outriggers **50** and **52** thereby mount the base **48** of each bracket **16** to the frame **14**. The first outrigger **50** of each bracket **16** is positioned adjacent the second outrigger **52** of an adjacent bracket.

The base **48** of each bracket **16** comprises a pole facing section **54** mounted to an outward facing section **56**. The pole facing section **54** is U-shaped and comprises an elongated back plate **58** and a pair of arms **60** spaced from one another and extending outwardly from the elongated back plate toward the monopole **12**, Each of the arms **60** is disposed at right angles to the elongated back plate **58**. The distal end of each arm **60** provides a contact point with the monopole tower **12**. Triangular reinforcing plates **62** extend between each arm **60** and the elongated back plate **58** of the pole facing section **54**.

The outward facing section **56** of the base **48** is also U-shaped and comprises an elongated back plate **64** and a pair of legs **66** spaced from one another and extending from opposite ends of the elongated back plate outwardly from one another, Each leg **66** of the outward facing section **56** is disposed at approximately 150° with respect to the elongated back plate **64** of the outward facing section. The elongated back plate **64** of the outward facing section **56** is connected to the elongated back plate **58** of the pole facing section **54** such that the legs **66** of the outward facing section **64** extend away from the monopole tower **12**.

The base **48** further comprises a central support plate **68** which extends between the legs **66** of the outward facing section **56** and along the elongated back plate **64** of the outward facing section **56** substantially along the midsection of the outward facing section. The central support plate **68** is perpendicular to the legs **66** and elongated back plate **64** of the outward facing section **56**. The base also includes a reinforcing plate **70** extending upwardly between the central support plate **68** and the elongated back plate **64** of the outward facing section **56**. This reinforcing plate **70** is perpendicular to and extends from the middle of both the elongated back plate **64** and central support plate **68** of the outward facing section **56**. Other reinforcing plates **72** and **74** extend beneath the central support plate **68** between the central support plate and respective legs **66** of the outward facing section **56**. These reinforcing plates **72** and **74** are perpendicular to the respective legs **66** and extend from the middle of those legs.

The first and second outriggers **50** ad **52** of each bracket **16** extend from and are mounted to the upper portions of respective legs **66** of the outward facing sections **56** of the brackets. The outriggers **50** and **52** are fastened to the legs **66** with bolts **76** and are disposed against the legs and the central support plate **68**. The outriggers **50** and **52** extend away from the elongated back plate **64** of each outward facing section **56** at a 150° with respect to the elongated back plate.

The connectors **18** comprise pairs of threaded rods **78** extending between adjacent brackets **16**. The threaded rods **78** extend through holes in the legs **66** of the outward facing sections **56** of the brackets **16**. One of the threaded rods **78** of each pair of threaded rods extends through a corresponding hole in associated first and second outriggers **50** and **52** of adjacent brackets **16**. The other of each pair of threaded rods **78** extends below the first and second outriggers **50** and **52** and between the legs **66** of adjacent brackets **16**. A head **80** is mounted to one end of each of the threaded rods **78**. The heads **80** are positioned outwardly of the respective bracket base legs **66** and first outriggers **50**, with respect to the threaded rods **78**. The heads **80** of the upper threaded rods **78** hold the first outriggers **50** against the respective legs **66** of the bracket bases **48**. The connectors **18** further comprise nuts **82** threaded onto the threaded rods **78** and positioned proximate the opposite end of the threaded rods from the heads **80** and outwardly of the second outriggers **52**, with respect to the threaded rods, and inwardly of the first and second outriggers **50** and **52** and the legs **66**, with respect to the threaded rods. The nuts **82** are movable along the length of the threaded rods **78** to selectively compress the associated first and second outriggers **50** and **52** together, and alternatively, decompress the first and second outriggers. When the first and second outriggers **50** and **52** are compressed, the arms **60** of the brackets **16** are forced against the monopole **12** and hold the mounting platform **10** at a desired location on the monopole. When the first and second outriggers **50** and **52** are decompressed, the brackets **16** are released from against the monopole **12** so that the mounting platform is movable along the length of the monopole. The connectors **18** also include washers **84** between the heads **80** and nuts **82** and the outriggers **50** and **52** and legs **66**.

The first and second outriggers **50** and **52** extend from the bracket bases **42** to respective comer regions **44** of the frame **14**. The first and second outriggers **50** and **52** are mounted

to the peripheral support bars **26** and interior support bars **30** of the frame **14** at the corner regions **44** of the frame. The outriggers **50** and **52** are mounted to the frame **14** by conventional methods such as welding or bolting. Each of the brackets **16** are positioned adjacent one of the sections **20**, **21**, **22** of the frame **14** substantially midway between adjacent corner regions **44**. The first and second outriggers **50** and **52** of a particular bracket **16** extend toward adjacent corner regions **44** and not the same corner region. The bracket **16** and first and second outriggers **50** and **52** are positioned such that when the mounting antenna platform **10** is mounted to the monopole **12**, the first and second outriggers of adjacent brackets extend parallel to one another toward the same corner region **44**. The arrangement provides for a balanced antenna mounting platform.

When the antenna mounting platform **10** is to be mounted about the monopole tower **12**, the nuts **82** on the threaded rods **78** of the connectors **18** are loosened and the antenna mounting platform is placed about the circumference of the monopole tower **12**, so that the monopole tower **12** is received within the interior opening **46** of the frame **14**. The antenna mounting platform **10** is moved along the length of the monopole tower **12** until the desired location for the antenna mounting platform is reached. The nuts **82** on the threaded rods **78** are then tightened until the bracket arms **60** are forced firmly against the monopole tower **12** and the antenna mounting platform is held firmly in place against the monopole tower. Antennas can then be mounted on the deck **23** and the rail **36** of the frame **14**. When it is desirable to move the location of the antenna mounting platform **10** along the length of the monopole tower **12**, the nuts **82** are again loosened and the antenna mounting platform is moved.

It should be understood that the foregoing relates to particular embodiments of the present invention, and the numerous changes may be made therein without departing from the scope and spirit of the invention as defined by the following claims.

I claim:

1. An antenna mounting platform for mounting at selectable positions along the length of a monopole tower comprising:

a frame having an interior opening for receiving the monopole;

a plurality of brackets mounted to the frame and extending into the interior opening, the brackets being spaced about the interior opening so that when the antenna mounting platform is mounted to the monopole, the brackets are spaced about the circumference of the monopole, the brackets each comprising:

a base;

a pair of arms spaced from one another and extending from the base toward the monopole when the interior opening receives the monopole; and

first and second outriggers spaced from one another and extending between and mounted to the base and the frame so that the first and second outriggers mount the base to the frame and the first outrigger of each bracket is positioned adjacent the second outrigger of an adjacent bracket; and

a number of connecting members corresponding to the number of brackets for connecting the brackets, each connecting member connecting adjacent brackets and being operable to selectively (1) compress the associated first and second outriggers together and thereby force the arms of the brackets against the monopole and hold the mounting platform at a location on the monopole, and alternatively, (2) decompress the associated first and second outriggers and thereby release the brackets from against the monopole so that the mounting platform is movable along the length of the monopole.

2. An antenna mounting platform as in claim **1** wherein each connecting member comprises:

a threaded rod extending between adjacent brackets;

a head at one end of the rod for holding one of the adjacent brackets; and

a nut threaded onto an opposite end of the rod for holding the other of the adjacent brackets and being movable along the length of the rod to selectively compress the associated first and second outriggers together, and alternatively, decompress the associated first and second outriggers.

3. An antenna mounting platform as in claim **1** wherein each connecting member connects the first outrigger of one bracket to the second outrigger of an adjacent bracket and extends between the associated first and second outriggers proximate the brackets.

4. An antenna mounting platform as in claim **3** wherein each connecting member comprises:

a threaded rod extending between the associated first and second outriggers and through passages in the associated first and second outriggers;

a head at one end of the rod and positioned outwardly of one of the associated first and second outriggers for holding one of the associated first and second outriggers; and

a nut threaded onto an opposite end of the rod outwardly of the other of the associated first and second outriggers and being movable along the length of the rod to selectively compress the associated first and second outriggers together, and alternatively, decompress the associated first and second outriggers.

5. An antenna mounting platform as in claim **1** wherein the brackets are spaced about the interior opening so that when the antenna mounting platform is mounted to the monopole, the brackets are spaced substantially equidistant about the circumference of the monopole.

6. An antenna mounting platform as in claim **5** wherein the brackets are three in number.

7. An antenna mounting platform as in claim **6** wherein the frame is substantially triangular in shape.

8. An antenna mounting platform as in claim **7** wherein the triangular frame has comer regions and the first and second outriggers of each bracket are mounted to and extend from adjacent comer regions.

9. An antenna mounting platform as in claim **8** wherein the triangular shape of the frame is equilateral.

10. An antenna mounting platform as in claim **9** wherein the frame comprises three sections of substantially equal length and each of the brackets are positioned adjacent one of the sections and substantially midway between adjacent corner regions.

11. An antenna mounting platform as in claim **1** wherein the frame comprises a deck.

12. An antenna mounting platform as in claim **11** wherein the deck has a periphery and the frame further comprises a rail mounted to the deck about the periphery of the deck.

* * * * *